

WHAT IS CLAIMED IS:

1. A method of preparing a group III-V compound semiconductor crystal having carbon doped, comprising the steps of:

5 filling a crucible or a boat with compound raw material, solid carbon, and boron oxide,

sealing said crucible or boat filled with said compound raw material, said solid carbon, and said boron oxide within an airtight vessel formed of a gas impermeable material,

10 heating and melting said compound material in the sealed state within said airtight vessel, and

solidifying said melted compound material to grow a carbon-doped compound semiconductor crystal.

2. The method of preparing a group III-V compound semiconductor crystal according to claim 1, wherein said step of heating and melting the compound material comprises the step of heating and melting said boron oxide 5 to bring the heat-melted boron oxide into contact with at least a portion of the solid carbon.

3. The method of preparing a <sup>carbon-doped</sup> group III-V compound

semiconductor crystal according to claim 1, wherein said gas impermeable material comprises a material selected from the group consisting of quartz and pBN.

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4. The method of preparing a group III-V compound semiconductor crystal according to claim 1, wherein said boron oxide contains water.

5. The method of preparing a group III-V compound semiconductor crystal according to claim 4, wherein said boron oxide contains water of 10-500 wt ppm.

6. The method of preparing a group III-V compound semiconductor crystal according to claim 1, wherein an amount of said filled solid carbon is larger than the amount of carbon doped into said compound semiconductor crystal.

5. A method of preparing a group III-V compound semiconductor crystal according to claim 6, wherein the amount of said filled solid carbon is at least 10 times larger than the amount of carbon doped into said compound semiconductor crystal.

8. The method of preparing a group III-V compound

semiconductor crystal according to claim 1, wherein said solid carbon is subjected to a heat treatment under reduced pressure before filling said crucible or boat.

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9. The method of preparing a group III-V compound semiconductor crystal according to claim 8, wherein said heat treatment is carried out for 1 hour to 12 hours at a temperature of 500°C-2000°C under a pressure of 1 Torr - 1  
5  $\times 10^{-8}$  Torr.

10. The method of preparing a group III-V compound semiconductor crystal according to claim 1, wherein said melted compound raw material is kept in a melted state for a certain time period before being solidified to grow a  
5 crystal.

11. The method of preparing a group III-V compound semiconductor crystal according to claim 10, wherein said melted compound raw material is kept in a melted state for 3-72 hours.

11 1/2. The method of preparing a <sup>carbon-doped</sup> group III-V compound semiconductor crystal according to claim 1, wherein said solid carbon comprises powder carbon.

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13. The method of preparing a group III-V compound semiconductor crystal according to claim 12, wherein said powder solid carbon has a grain size of not more than 100 $\mu$ m.

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14. The method of preparing a group III-V compound semiconductor crystal according to claim 1, wherein said solid carbon comprises fiber carbon.

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15. The method of preparing a group III-V compound semiconductor crystal according to claim 14, wherein said fiber solid carbon has an average diameter of not more than 50 $\mu$ m.

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16. The method of preparing a group III-V compound semiconductor crystal according to claim 1, wherein said solid carbon comprises bulk carbon.

*Sub A*  
17. The method of preparing a group III-V compound semiconductor crystal according to claim 16, wherein said bulk solid carbon has a disk shape smaller than an inner diameter of said crucible.

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18. The method of preparing a group III-V compound semiconductor crystal according to claim 16, wherein said

bulk solid carbon comprises a sintered compact of carbon powder.

18. 19. A method of preparing a group III-V compound semiconductor crystal according to claim 1, wherein said crucible or boat comprises pBN.

20. The method of preparing a group III-V compound semiconductor crystal according to claim 1, wherein said group III-V compound semiconductor crystal comprises a GaAs crystal.

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add A  
add B  
add B'